L3: Entry 1 of 13 File: USPT Jul 17, 2001

DOCUMENT-IDENTIFIER: US 6262149 B1
TITLE: Acrylic modified waterborne sulfonated alkyd dispersions

Brief Summary Paragraph Right (18):
Generally sulfonated waterborne alkyd resins may be prepared by reacting a monobasic fatty acid, fatty ester or naturally occurring-partially saponified oil; a glycol or polyol; a polycarboxylic acid; and a sulfomonomer or sulfomonomer adduct containing at least one sulfomonomer group.

Brief Summary Paragraph Right (21):
The glycol or polyol is preferably selected from aliphatic, alicyclic, and aryl alkyl glycols. Suitable examples of glycols include, but are not limited to, ethylene glycol, propylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, pentaethylene glycol, hexaethylene glycol, heptaethylene glycol, octaethylene glycol, nonaethylene glycol, decaethylene glycol, 1,3-propanediol, 2,4-dimethyl-2-ethyl-hexane-1,3-diol, 2,2-dimethyl-1,2-propanediol, 2-ethyl-2-butyl-1,3-propanediol, 2-ethyl-2-isobutyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-tetramethyl-1,6-hexanediol, thiodiethanol, 1,2-cyclohexanedimethanol, 1,3-cyclohexanedimethanol, 1,4-cyclohexanedimethanol, 2,2,4-trimethyl-1,3-pentanediol, 2,2,4-tetramethyl-1,3-cyclobutanediol, p-xylenediol, hydroxypivalyl hydroxypivalate, 1,10-decanediol, hydrogenated bisphenol A, trimethylolpropane, trimethylolethane, pentaerythritol, erythritol, threitol, dipentaerythritol, sorbitol, glycerine, trimellitic anhydride, pyromellitic dianhydride, dimethylolpropiconic acid, and the like.

Brief Summary Paragraph Right (25):
The sulfomonomer of the sulfomonomer adduct is either a difunctional or a monofunctional monomer containing a --SO.sub.3 M group attached to an aromatic nucleus where M is hydrogen or a metal ion such as, for example, Na.sup.+, Li.sup.+, K.sup.+, Ca.sup.2+, Cu.sup.2+, Fe.sub.2+, or Fe.sub.3+. The sulfomonomer as a difunctional monomer component may be a dicarboxylic acid (or a derivative thereof) containing a --SO.sub.3 M group where M is as defined above. Suitable examples of the aromatic nucleus to which the --SO.sub.3 M group may be attached include, but are not limited to, benzene, naphthalene, anthracene, diphenyl, oxydiphenyl, sulfonyl-diphenyl, and methylenediphenyl.

Brief Summary Paragraph Right (31):
Optionally, the sulfomonomer containing at least one sulfonate group that may be reacted with a polyol to produce a polyol (e.g. a diol) sulfomonomer adduct may be a monofunctional sulfomonomer containing at least one sulfonate group that may be reacted with a polyol containing at least three hydroxyl groups. The monofunctional sulfomonomer is preferably selected from the following group of sulfomonomers:
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Brief Summary Paragraph Right (32):
When the polyol sulfomonomer adduct is prepared by reacting a difunctional sulfomonomer with a polyol, the polyol is preferably a diol. Suitable examples of diols include those described above with the following diols being more preferred: ethylene glycol, diethylene glycol, 2,2,4-trimethyl-1,3-pentanediol, 1,4-cyclohexanedimethanol, 1,3-cyclohexanedimethanol, hydroxypivalyl hydroxypivalate, dipropylene glycol, 1,6-hexanediol, 1,10-decanediol, 1,3-butanediol, hydrogenated bisphenol A, 1,4-butanediol and neopentyl glycol.

Brief Summary Paragraph Right (33):

In addition to the amount of polyol reacted with the fatty acid, fatty ester or naturally occurring-partially saponified oil according to the preferred step, and in addition to the polyol used in the preparation of the sulfomonomer adduct from a monofunctional sulfomonomer, an additional amount of a polyol or other branching agent such as a polycarboxylic acid may be used to increase the molecular weight and branching of the waterborne alkyd resin. These branching agents are preferably selected from trimethylolethane, pentaerythritol, erythritol, threitol, dipentaerythritol, sorbitol, glycerine, trimellitic anhydride, pyromellitic dianhydride, dimethylolpropionic acid, and trimethylolpropane.

Brief Summary Paragraph Right (59):
Examples of solvents and coalescing agents are well known and include but are not limited to ethanol, n-propanol, isopropanol, n-butanol, sec-butanol, isobutanol, ethylene glycol monobutyl ether, propylene glycol n-butyl ether, propylene glycol methyl ether, propylene glycol monopropyl ether, dipropylene glycol methyl ether, diethylene glycol monobutyl ether, trimethylpentanediol mono-isobutyrate, ethylene glycol mono-octyl ether, diacetone alcohol, TEXANOL.RTM. ester alcohol (Eastman Chemical Company), and the like. Such solvents and coalescing aids may also include reactive solvents and coalescing aids such as diallyl phthalate, SANTOLINK XI-100.RTM. (polyglycidyl allyl ether from Monsanto, and others as described in U.S. Pat. Nos. 5,349,026 and 5,371,148, incorporated herein by reference.

Detailed Description Paragraph Right (1):
Step 1: An adduct of neopentyl glycol (NPG) and 5-sodiosulfoisophthalic acid (SIP) was first prepared by reacting NPG (2483.5 g, 23.88 mol); SIP (93.3%) (1608.5 g, 5.6 mol); distilled water (276.0 g); and the catalyst, FASCAT 4100 (3.3 g) in a three-neck, round bottom flask equipped with a mechanical stirrer, a steam-jacketed partial condenser, a Dean-Stark trap, a nitrogen inlet, and a water condenser. The reaction temperature was gradually increased from 130.degree. C. to 190.degree. C. in a period of five hours and the condensate (water) collected in a Dean-Stark trap. The reaction was allowed to continue until an acid number of 3 was obtained. A portion of the resultant product was used in the following step.